



United States Government

Department of Energy

memorandum

Carlsbad Field Office
Carlsbad, New Mexico 88221

DATE: September 17, 2004

REPLY TO
ATTN OF: CBFO:NTP:KWW:JGW:04-1983:UFC:5822SUBJECT: Amendment of Authority Granted to INEEL AMWTP for Characterization and Certification
of Contact Handled Homogenous Solids Transuranic Waste

TO: Elizabeth Sellers, DOE-ID Manager



This memorandum replaces the certification granted by the DOE Carlsbad Field Office (CBFO) to the Advanced Mixed Waste Treatment Project's (AMWTP) transuranic (TRU) waste program through CBFO memorandum CBFO:NTP:KWW:VW:04-1061:UFC:5822, dated March 9, 2004. This memorandum also replaces CBFO:NTP:RM:VW:04-1089:UFC:5822, dated March 19, 2004, in which CBFO approved the use of 3100 m³ Project solids sampling and analysis data for the characterization of waste stream BNINW218, Building 374 sludge. The purpose of replacing these memoranda is to correct the list of containers that was previously included as Attachment 4 in memorandum CBFO:NTP:KWW:VW:04-1061:UFC:5822 and to accurately reflect that all the remaining inventory of Building 374 sludge (2000 containers not shipped by INEEL 3100m³ Project) was not part of the original population that was randomly sampled.

In addition, CBFO grants AMWTP the authority to use the four (4) Consonant Technologies, Inc. (CTI) headspace gas sampling and analysis systems. These systems were evaluated in CBFO audit A-04-12 that was conducted between April 12-15, 2004, at the AMWTP facilities.

Audit A-03-05

Audit A-03-05 was conducted at the AMTWP between August 18-22, 2003, to evaluate the technical and quality assurance programs for compliance with the "Waste Analysis Plan" (WAP) of the WIPP *Hazardous Waste Facility Permit*, the *Quality Assurance Program Document*, the *Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, and other CBFO requirements and standards. The audit team returned to AMWTP on October 15-16, 2003, to verify implementation of corrective actions and reconciliation of the acceptable knowledge record and determined that the following processes were satisfactory and effectively implemented.

040932



S3000 Homogeneous Solids

Acceptable knowledge

Data validation and verification

Gas generation testing

Headspace gas sampling (HSG) and analysis (3 NFT drum vent systems and four CTI HSG Systems)

Nondestructive assay (55 & 85 gallon drums)

Solids sampling

Real-time radiography (RTR)

Visual examination (quality control check on RTR)

WIPP Waste Information System (WWIS) interface

Transportation

Based on the results of Audit A-03-05, CBFO grants authority for characterization, certification, and transportation of homogeneous solids waste (S3000). For waste streams BNINW216 and BNINW218, this authority is limited to containers identified in Appendices D and E of BNFL's "Population Determination for Waste Stream Profiles BNINW216 and BNINW218," BNFL-5232-RPT-TRUW-19 Rev. 2. One of the following must be used for subsequent lots:

1. Solids sampling and analysis must be conducted in accordance with Attachment B2 of the WAP to confirm acceptable knowledge for subsequent lots, or
2. Prior written approval must be obtained from CBFO if AMWTP wishes to apply preliminary solids sampling and analysis data to later lots.

Please note that CBFO approval for lots subject to limitation 2 listed above is contingent upon successful discussion between CBFO and the New Mexico Environment Department as specified in NMED's limited approval letter dated December 23, 2003.

AMWTP lot one first and second stage sludge containers for waste streams BNINW216 and BNINW218 that are eligible for input into WWIS are identified in Appendices D and E of BNFL's "Population Determination for Waste Stream Profiles BNINW216 and BNINW218," BNFL-5232-RPT-TRUW-19 Rev. 2. Prior to input of containers not listed in these appendices the AMWTP must first meet the requirements in item 1 or 2 above.

Use of preliminary solids sampling and analysis data for confirmation of additional waste streams must be evaluated and approved in writing by CBFO on a case-by-case basis, as stated in item 2 above. This approval must be requested early enough to allow for a thorough review by CBFO. Containers from additional lots

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for which the AMWTP intends to apply preliminary solids sampling and analysis data shall not be shipped prior to receipt of written approval from CBFO.

Audit A-04-12

Four (4) Consonant Technologies, Inc. (CTI) headspace gas sampling and analysis systems were evaluated in CBFO audit A-04-12, conducted on April 12-15, 2004, at the AMWTP facilities. These systems are now approved for characterization of S3000 Homogeneous Solid Waste. The only sample collection method approved for use is sample collection by penetrating the carbon filter with a side-port needle, which was demonstrated during this audit. This approval does not permit the certification of drums that were sampled through the self-tapping screw or any method other than that demonstrated during Audit A-04-12. AMWTP must wait for CBFO approval of Audit A-04-22, held between August 16-20, 2004, to certify waste using the additional headspace gas sampling methods that were demonstrated during that audit. Transportation authority was previously granted on March 27, 2003 and was reviewed again during Audit A-04-12 and found to be satisfactory.

The attachments to this letter contain the complete lists of certified procedures, documents, and systems. AMWTP may not ship debris waste to the WIPP until all characterization and confirmation activities have been fully audited and approved. TRU waste certification, characterization, confirmation, or transportation using significantly revised or new processes, procedures, or systems must be evaluated by CBFO prior to their implementation. If there are any questions regarding the scope or conditions of these approvals, you should contact CBFO immediately.



R. Paul Detwiler
Acting Manager

Attachments

cc: w/attachments

F. Marcinowski, DOE-HQ	*ED
I. Triay, DOE-HQ	*ED
L. Piper, CBFO	*ED
K. Watson, CBFO	*ED
R. McCallister, CBFO	*ED
A. Holland, CBFO	*ED
M. Navarrete, CBFO	*ED
H. Bohrer, DOE-ID	*ED
M. LaFreniere, DOE-ID	*ED
R. Provencher, DOE-ID	*ED
J. Snook, DOE-ID	*ED
J. Wells, DOE-ID	*ED
E. Feltcorn, EPA	*ED
B. Forinash, EPA	*ED
B. Gitlin, EPA	*ED
R. Joglekar, EPA	*ED
S. Zappe, NMED	*ED
A. Dobson, BNFL	*ED
E. Schweinsberg, BNFL	*ED
K. Jackson, WTS	*ED
D. Kump, WTS	*ED
D. Standiford, WTS	*ED
M. Strum, WTS	*ED
J. May, CTAC	*ED
L. Greene, WRES	*ED
CTAC Document Coordinator	
WIPP Operating Record	
CBFO M&RC	

*ED denotes Electronic Distribution

AMWTP CERTIFICATION PROGRAM STATUS

The CBFO Office of the National TRU Program Manager and Quality Assurance Manager have evaluated the documentation supporting the results of Audits A-03-05 (held on August 18-22, 2003) and A-04-12 (held on April 12-15, 2004), and recommends to the CBFO Manager that authority for certification and characterization of contact handled homogenous solids be granted to the Advanced Mixed Waste Treatment Project for the following processes:

S3000 - Homogeneous Solids

Acceptable knowledge
Data validation and verification
Gas generation testing (2 mobile gas analysis systems)
Headspace gas sampling and analysis (3 NFT drum vent systems and 4 CTI HSG systems)
Nondestructive assay (2 Canberra Integrated Waste Assay Systems – 55 & 85 gallon drums)
Solids sampling
Real-time radiography (2 systems)
Visual examination as a quality control check on RTR
WIPP Waste Information System
Transportation

It is also recommended that this authority be limited to S3000 homogeneous solids waste. The AMWTP may not ship debris waste until all characterization activities have been fully audited and approved.

Transportation authority was previously granted on March 27, 2003 (memorandum CBFO:NTP:DCG:VW:03-1620:UFC:5822) and was re-evaluated during A-04-12 on April 12-15, 2004 and found to be satisfactory.

Attachments 2 and 3 are the lists of systems and procedures that constitute the bounds of the AMWTP characterization and certification authority.

STATUS

- All program elements are complete.
- The following required site documents that demonstrate how the AMWTP complies with the CBFO requirements are current and effectively implemented.
 - QAPjP – MP-TRUW-8.2, Revision 3, *Quality Assurance Project Plan*
 - GGTP QAPjP – MP-TRUW-8.4, Revision 0, *QAPjP for Gas Generation Testing Plan*
 - WCP – MP-TRUW-8.1, Revision 5, *Certification Plan for INEEL Contact-Handled Transuranic Waste*
 - QAP – Section 4.0 of MP-TRUW-8.1.
 - TRAMPAC and QA Plan – MP-TRUW-8.3, Revision 2, *TRUPACT-II Authorized Methods for Payload Control*

- Packaging QA Plan – Section 8 of MP-TRUW-8.3.
- Standard operating procedures (see attachment 3 for a complete procedure list)
- AMWTP participation in the following performance demonstration programs (PDPs):
 - **HSG PDP** – Participation was satisfactory in Cycle 18A for three GC/MS Systems (A – ID#0478107242, B – ID#0477907240, and C – ID#0478007241) . (Memo CBFO:NTP:MRB:JGW:04-1411 dated May 5, 2004).
 - **HSG PDP** – Participation was satisfactory in Cycle 18A for CTI GS/MS system CTI-HGAS-A-004 and three identical systems CTI-HGAS-A-001, CTI-GHAS-A-002, CTI-HGAS-005 (Memo CBFO:NTP:MRB:VW:04-1105:UFC:5822 dated March 24, 2004)
 - **NDA PDP Drums** -- Participation was approved for two Canberra Integrated Waste Assay Systems (DAS-102 and DAS-103) in Cycle 10A (Memo CBFO:NTP:MRB:IW:04-0261:UFC:5822 dated January 29, 2004).
 - **RCRA Drums** – Participation was satisfactory (ALD INEEL) in Cycle 11A for the analysis of metals and aqueous extractable VOCs (Memo CBFO:NTP:MRB:JGW:04-1426:UFC:5822 dated May 13, 2004)
- CBFO completed Audit A-03-05 on August 22, 2003 and issued the interim audit report on September 18, 2003. The audit team returned to the AMWTP on October 15, 2003 and verified corrective action completion before issuing the Final Audit Report to NMED on November 12, 2003. A revised Final Audit Report was issued to NMED on December 12, 2003. The audit team determined that the AMWTP TRU waste program is in compliance with the CBFO requirements and the processes evaluated were implemented effectively.
- CBFO conducted Audit A-04-12 on April 12-15, 2004 and issued the interim audit report on April 26, 2004. The Final Audit Report was issued to NMED on May 6, 2004.
- NMED approved Final Audit Report A-03-05 for homogeneous solids on December 23, 2003, but limited the approval for use of preliminary solids sampling and analysis data to only those waste containers remaining from the first lot of the original 3100 m³ project.
- NMED approved Final Audit Report A-04-12 for CTI HSG System on July 2, 2004.
- EPA issued a QA inspection report on November 13, 2003 based on an inspection conducted August 19-21, 2003 that contained outstanding quality assurance issues. EPA returned for a followup inspection on October 15-16, 2003 to close out those issues and issued approval on March 9, 2004. EPA issued the technical inspection report on January 30, 2004. CBFO responded to three findings and one concern on February 19, 2003. EPA issued the final approval for the AMWTP on March 8, 2004.
- There were six CARs issued during Audit A-03-05. CARs 03-072 through 03-77 were successfully closed on October 28, 2003. Also, NDA CAR 04-006 was issued to AMWTP on October 27, 2003 and successfully closed on November 6, 2003. No CARs remain open at the AMWTP.
- One CAR related to transportation (04-019) was issued as a result of Audit A-04-12 and was closed on July 6, 2004.

RECOMMENDATION

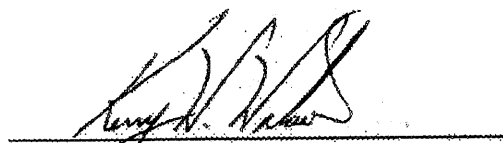
The recommendation to the CBFO Manager is to grant the INEEL AMWTP authority for characterization, certification, and shipment of contact-handled transuranic S3000 homogenous solids using those processes audited and approved during Audit A-03-05 with the exceptions noted above and in the cover letter.

CONCURRENCE



Ms. Ava L. Holland
CBFO Quality Assurance Manager

9/15/04
Date



Mr. Kerry W. Watson, Director
Office of Characterization and Transportation

9/15/04
Date

INEEL AMWTP EQUIPMENT LIST

WIPP #	Site Equipment #	Procedure Number Method Equipment Description	Components	Software
Gas Generation Testing				
9GG1	MGAS-1	Mobile Gas Analysis System – Unit 1 Method described in procedure INST-OI-18)	On-line Gas Chromatograph	EZ Chrom 200, GGTS Excel Application
9GG2	MGAS-2	Mobile Gas Analysis System – Unit 2 (Method described in procedure INST-OI-18)	On-line Gas Chromatograph	EZ Chrom 200, GGTS Excel Application
Headspace Gas				
9HG1	Z-220-001A	Nuclear Filter Technology Drum Vent System PDP ID# 0478107242 (18A Identical System – 05/05/04) (Method described in procedure INST-OI-13)	Varian Saturn Gas Chromatograph – Mass Spectrometer, Unit A.	Varian Saturn Work Station (WS)
9HG2	Z-220-001B	Nuclear Filter Technology Drum Vent System PDP ID# 0477907240 (18A Identical System – 05/05/04) (Method described in procedure INST-OI-13)	Varian Saturn Gas Chromatograph – Mass Spectrometer, Unit B.	Varian Saturn Work Station (WS)
9HG3	Z-220-001C	Nuclear Filter Technology Drum Vent System PDP ID# 0478007241 (18A Participation – 05/05/04) (Method described in procedure INST-OI-13)	Varian Saturn Gas Chromatograph – Mass Spectrometer, Unit C.	Varian Saturn Work Station (WS)
9HG4	CTI-HGAS-A-001	Consonant Technology Inc. – Headspace Gas Analysis System PDP ID # CTI-HGAS-A-001 (18A Identical System – 3/24/04) (Method described in procedure INST-OI-43)	Agilent GC/MSD-GC/TCD Unit A-001	CTI-modified Agilent Technologies Chemstation software, G1701DA, and reprocessing software, G1710DA
9HG5	CTI-HGAS-A-002	Consonant Technology Inc. – Headspace Gas Analysis System PDP ID # CTI-HGAS-A-002 (18A Identical System – 3/24/04) (Method described in procedure INST-OI-43)	Agilent GC/MSD-GC/TCD Unit A-002	CTI-modified Agilent Technologies Chemstation software, G1701DA, and reprocessing software, G1710DA

WIPP #	Site Equipment #	Procedure Number Method Equipment Description	Components	Software
9HG6	CTI-HGAS-A-004	Consonant Technology Inc. – Headspace Gas Analysis System PDP ID # CTI-HGAS-A-004 (18A Approved – 3/24/04) (Method described in procedure INST-OI-43)	Agilent GC/MSD-GC/TCD Unit A-004	CTI-modified Agilent Technologies Chemstation software, G1701DA, and reprocessing software, G1710DA
9HG7	CTI-HGAS-A-006	Consonant Technology Inc. – Headspace Gas Analysis System PDP ID # CTI-HGAS-A-005 (18A Identical System – 3/24/04) (Method described in procedure INST-OI-43)	Agilent GC/MSD-GC/TCD Unit A-006	CTI-modified Agilent Technologies Chemstation software, G1701DA, and reprocessing software, G1710DA
Drum Coring				
9DC1	Z-250-802	Drum Coring and Solid Sample Collection System (Method described in procedure INST-OI-16)	Drum Coring and Sample Collection Glove Box.	Waste Tracking System (WTS)
Nondestructive Assay				
9DA1	Z-211-102	Canberra Integrated Waste Assay System for assay and isotopics on 55-gallon and 85-gallon drums DAS –102 - PDP Registration # AM01/AMN1 Drum Assay System, Unit1. (Method described in procedure INST-OI-14)	Integrated Waste Assay System (IWAS) ➤ High Resolution Gamma Ray Spectrometer (HGRS) ➤ High Efficiency Neutron Counter (HENC) ➤ Cf-252 Add-A-Source (AAS) ➤ Differential Die-Away (DDA) systems.	NDA 2000
9DA2	Z-211-103	Canberra Integrated Waste Assay System for assay and isotopics on 55-gallon and 85-gallon drums DAS-103 - PDP Registration # AM02/AMN2 Drum Assay System, Unit2. (Method described in procedure INST-OI-14)	Integrated Waste Assay System (IWAS) ➤ High Resolution Gamma Ray Spectrometer (HGRS) ➤ High Efficiency Neutron Counter (HENC) ➤ Cf-252 Add-A-Source (AAS) ➤ Differential Die-Away (DDA) systems.	NDA 2000
Nondestructive Examination				
9RR1	Z-213-101	Real Time Radiography System (Method described in procedure INST-OI-12)	RTR System.	Waste Tracking System (WTS)
9RR2	Z-213-106	Real Time Radiography System (Method described in procedure INST-OI-12)	RTR System.	Waste Tracking System (WTS)

INEEL AMWTP LIST OF CERTIFIED PROCEDURES		
#	Procedure Number	Procedure Title
1.	CI-IDA-NDA 0035	Calibration verification & confirmation procedure for Integrated Waste Assay System (IWAS)
2.	INST-CD&M 11.1.1	Facility Modification Screening
3.	INST-CD&M 11.2.1	Software Version Control
4.	INST-CD&M 11.1.2	Facility Modification Proposal Preparation
5.	INST-CD&M 11.2.2	Software Inventory Classification
6.	INST-CMNT 10.14.1	Testing In-Plant and Process Instrumentation
7.	INST-CMNT 10.5.1	Identification and Control of Measuring and Test Equipment
8.	INST-OI 09	Retrieval Enclosure Waste Container Extraction
9.	INST-OI 11	Waste Container Handling
10.	INST-OI 12	RTR Operations
11.	INST-OI 13	Drum Vent/Headspace Gas Sample Operations
12.	INST-OI 14	Drum Assay Operations
13.	INST-OI 16	Drum Coring Operations
14.	INST-OI 18	Gas Generation Testing Operation
15.	INST-OI 20	TRUPACT-II Operations
16.	INST-OI 21	Payload Assembly
17.	INST-OI 24	Waste Packaging
18.	INST-OI 34	Visual Examination Operating Procedures and Data Reporting
19.	INST-OI 43	HGAS Sampling and Analysis Operations
20.	INST-TRUW 8.1.1	Drum Assay Post Maintenance Calibration & Verification
21.	INST-TRUW 8.2.1	HSG Calibration
22.	MP-ADMIN 1.19	AMWTP Organization Charts
23.	MP-CD&M 11.1	Change Control
24.	MP-CD&M 11.2	Software Quality Assurance
25.	MP-CDMN 10.10	TRUPACT-II Maintenance Program
26.	MP-CMNT 10.14	In-Plant and Process Instrumentation Testing Program
27.	MP-CMNT 10.3	Supply Chain Management
28.	MP-CMNT 10.5	Calibration of Measuring and Test Equipment Program
29.	MP-DOCS 18.1	Developing Written Work Instructions
30.	MP-DOCS 18.2	AMWTP Records Management
31.	MP-DOCS 18.3	Developing Management Procedures
32.	MP-DOCS 18.4	Document Control
33.	MP-M&IA 17.1	Management Assessments
34.	MP-M&IA 17.2	Independent Assessments
35.	MP-M&IA 17.3	Surveillances
36.	MP-PCMT 15.1	Purchase Requisition Preparation
37.	MP-PCMT 15.3	Purchase Order/Subcontract Contract Preparation & Control
38.	MP-PCMT 15.4	Evaluation of Proposals
39.	MP-PCMT 15.6	Acceptance of Items and Services
40.	MP-PCMT 15.7	Vendor Qualification and Performance Evaluation
41.	MP-Q&SI 5.1	Investigations & Root Cause Analysis
42.	MP-Q&SI 5.3	Corrective Action
43.	MP-Q&SI 5.4	Identification of Nonconforming Conditions
44.	MP-Q&SI 5.6	Graded Approach
45.	MP-Q&SI 5.7	Quality Inspections
46.	MP-Q&SI 5.8	Qualification of Inspection, Test and Audit Personnel
47.	MP-RTQP 14.1	Preparation and Administration of Individual Training Plans
48.	MP-RTQP 14.4	Personnel Qualification and Certification
49.	MP-RTQP 14.6	Job and Training Needs Analysis
50.	MP-RTQP 14.16	Training Program Evaluation
51.	MP-RTQP 14.19	Training Records Administration

INEEL AMWTP LIST OF CERTIFIED PROCEDURES			
#	Procedure Number		Procedure Title
52.	MP-RTQP	14.20	Training Implementation Matrix (TIM)
53.	MP-TRUW	8.1	Certification Plan for INEEL CH-TRU Waste
54.	MP-TRUW	8.5	TRU Waste Certification
55.	MP-TRUW	8.11	Data Reconciliation
56.	MP-TRUW	8.12	Waste Receipt and Shipping Inspection
57.	MP-TRUW	8.13	Collection, Review, Confirmation, and Management of Acceptable Knowledge Documentation
58.	MP-TRUW	8.14	Preparation of Waste Stream Profile Forms
59.	MP-TRUW	8.16	WWIS Data Transfer
60.	MP-TRUW	8.17	Co-located Core Sampling Control Charts
61.	MP-TRUW	8.19	RTR/VE Drum Selection
62.	MP-TRUW	8.2	Quality Assurance Project Plan (QAPjP)
63.	MP-TRUW	8.25	RCRA Statistical Sampling
64.	MP-TRUW	8.26	Reports to Management
65.	MP-TRUW	8.27	TRUCON Management
66.	MP-TRUW	8.3	TRUPACT-II Authorized Methods for Payload Control (TRAMPAC)
67.	MP-TRUW	8.4	QAPjP for Gas Generation Testing Program
68.	MP-TRUW	8.5	TRU Waste Certification
69.	MP-TRUW	8.6	Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC for HalfPACT)
70.	MP-TRUW	8.8	Level I Data Validation
71.	MP-TRUW	8.9	Level II Data Validation

MATERIAL SAFETY DATA SHEET

Methyl Blue, Certified

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STATEMENT OF HAZARDOUS NATURE

Hazardous according to criteria of Worksafe Australia

COMPANY DETAILS

Company:	ProSciTech
Address:	PO Box 111, Thuringowa Central Qld. 4817 Australia
Street Address:	1/11 Carlton Street, Kirwan, Qld, 4817 Australia
Telephone Number:	(07) 4773 9444
Fax Number:	(07) 4773 2244

IDENTIFICATION SECTION

Product Name	Methyl Blue, Certified
Other Names	Analine Blue; Acid Blue 93; Acid Laether Blue HER
Product Code	C123
U.N. Number	None allocated
Dangerous Goods Class and Subsidiary Risk	None allocated
Hazchem Code	None allocated
Poison Schedule	None allocated
Use	Biological stain

Physical Description and Properties

Appearance	Solid, deep brown fine crystals
Boiling Point/Melting Point	No data
Vapour Pressure	No data
Specific Gravity	No data
Flash Point	No data
Flammability Limits	No data
Solubility in water	No data

Other Properties

Ingredients

Chemical Name	CAS Number	Proportion
C ₃₇ H ₂₇ N ₃ Na ₂ O ₉ S ₃	28983-56-4	

HEALTH HAZARD INFORMATION

Health Effects:

Acute

Swallowed: May be harmful if swallowed.
Eye: May cause eye irritation.
Skin: May be harmful if absorbed through the skin. May cause skin irritation.
Inhaled: May be harmful by inhalation. Material may be irritating to mucus membranes and upper respiratory tract.

Chronic: Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

First Aid:

Swallowed: Wash out mouth with water provided person is conscious. Call a doctor.
Eye: Immediately flush eyes with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.
Skin: Immediately flush skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Wash contaminated clothing before reuse.
Inhaled: Remove to fresh air. If not breathing give artificial respiration. If breathing is difficult give oxygen.
First Aid Facilities: Eye bath, safety shower

Advice to Doctor

PRECAUTIONS FOR USE

Exposure Standards: None established.
Engineering Controls: Mechanical exhaust required.
Personal Protection: Wear appropriate respirator, chemical-resistant gloves, safety goggles and other protective clothing.
Flammability: Not flammable under conditions of use

SAFE HANDLING INFORMATION

Storage and Transport: Store in a cool dry place. Keep tightly closed. Avoid inhalation and contact with eyes and skin.
Spills and Disposal: Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.
Disposal: Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state and local laws.
Fire/Explosion Hazard: Extinguishing media : carbon dioxide, dry chemical powder, water spray. Firefighters should wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Emits toxic fumes under fire conditions.

OTHER INFORMATION

Incompatibilities
(Materials to avoid) Strong oxidising agents.
Animal Toxicity Data: Data not available

The information published in this Material Safety Data Sheet has been compiled from data in various technical publications. It is the user's responsibility to determine the suitability of this information for adoption of necessary safety precautions. We reserve the right to revise material Safety Data Sheets as new information becomes available. Copies may be made for non-profit use.